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Date: December 15, 2005

Michelle Rhodes

Michelle Rhodes

RESPONSE UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
GROUP ART UNIT 2818

DOCKET NUMBER
50626.59

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Chun Ho FAN et al. Serial No.: 10/678,419 Filing or 371(c) Date: October 3, 2003 Title: IMPROVED FLIP CHIP BALL GRID ARRAY PACKAGE	Art Unit: 2818 Examiner: M. Tran

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the third Office Action dated September 16, 2005, please consider Applicants' arguments and remarks that start on page 2 concerning the rejection issued in the third Office Action dated September 16, 2005. This Pre-Appeal Brief Request for Review is being filed with a Notice of Appeal.

REMARKS/ARGUMENTS

Claims 1-17 are pending in this application.

Applicants argument concerning the rejections issued in the third Office Action dated September 16, 2005 are summarized as follows:

- **Bernier et al. and Utagikar et al. fail to teach an intermetallic heat spreader.**

This argument will be discussed in more detail below.

Claims 1-6 were rejected under 35 U.S.C. § 102(b) as being anticipated by Bernier et al. (U.S. 6,069,023). Claims 1, 7 and 8 were rejected under 35 U.S.C. § 102(e) as being anticipated by Utagikar et al. (U.S. 6,583,513). Claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Utagikar et al. Claims 11, 12, 16 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bernier et al. Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bernier et al. in view of Chen et al. (US 2003/0150595). Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bernier et al. in view of Alcoe et al. (U.S. 6,570,259). Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bernier et al. in view of Shaw et al. (U.S. 5,330,701). Applicants respectfully traverse the rejections of claims 1-17.

Applicants' claims 1 and 16 recite the feature of "an intermetallic heat spreader."

On page 2 of the Office Action dated September 16, 2005, the Examiner alleged that Bernier et al. teaches "an intermetallic (col. 15, lines 35-36) heat spreader 246." On page 4 of the Office Action dated September 16, 2005, the Examiner alleged that Utagikar et al. teaches "an intermetallic heat spreader 144." Applicants respectfully disagree.

As argued in the Request for Reconsideration filed on July 8, 2005, the disclosure of an aluminum alloy or a metal alloy, as taught by Bernier et al. and Utagikar et al., for the heat sink is not equivalent to the intermetallic heat spreader recited in Applicants' claims 1 and 16. While an intermetallic includes multiple metals, it is not the case that a metal alloy is necessarily an intermetallic. In fact, the vast majority of metal

alloys are not intermetallics. For example, a NiAl alloy can and does form a metal alloy that does not include any intermetallic compounds. Thus, the mere reference to the use of an aluminum alloy or a metal alloy certainly does not infer or necessitate the use of an intermetallic compound.

Applicants have presented this argument in each of the Request for Reconsiderations filed on June 8, 2005 and July 8, 2005. However, the Examiner has failed to specifically respond to this argument each time it was presented.

In the Response to Arguments section on pages 4 and 5 of the Final Office Action dated March 8, 2005, the Examiner alleged that "Bernier teaches in claim 36 (col. 15, lines 34-36) that 'selecting an aluminum alloy for the heat sink' and Utagikar teaches 'the lid 144 is made of a metal or metal alloy and serves to conduct heat away from the integrated circuit' (col. 6, lines 29-31). Also, an intermetallic material is clearly a metal alloy that [is] composed of two or more metals or of a metal and a nonmetal. Therefore, for the above reasons, it is believed that the rejection should be sustained." These allegations are clearly incorrect.

In contrast to the Examiner's allegations, by definition, an intermetallic compound is a true chemical bond. The advantages of a chemically bound atomic structure over conventional metallic alloys is significant. Typically, an alloy is composed of various elements melted together in a fashion to produce a uniform distribution of mixed metals. These bonds that have formed between the various elements of an alloy are quite weak and are subject to easy chemical or mechanical attack. But since the elements of an intermetallic compound are chemically bound to each other, the bonds are exceptionally strong and are composed of a specific fixed ratio of the elements.

Intermetallic compounds differ in a number of important ways from conventional metal alloys. Conventional metal alloys consist of a disordered solid solution of one or more metallic elements. They do not have any particular chemical formula, and are best described as consisting of a base material to which certain percentages of other elements have been added. In chemical terms, alloys are mixtures of phases. For example, a popular stainless steel has a composition Fe-18%Cr-8%Ni.

An intermetallic compound, on the other hand, is a particular chemical compound based on a definite atomic formula, with a fixed or narrow range of chemical compositions. An example could be $MoSi_3$.

Support for the description of an intermetallic compound may be found at the following internet links:
http://www.met.kth.se/mattechnol/FUMA2002/IntermetallicApplic/intermetallics.doc
http://www.cerko.com/diffusion.htm.

Thus, the mere teaching of an aluminum alloy or a metal alloy heat sink, as allegedly taught by Bernier et al. and Utagikar et al., certainly does not teach or suggest an intermetallic heat spreader as recited in Applicants' claims 1 and 16. As noted above, the clear and significant differences between an intermetallic and an aluminum alloy are well known and recognized in the art. Therefore, Applicants respectfully submit that neither Bernier et al. nor Utagikar et al. teaches or suggests the feature of "an intermetallic heat spreader" as recited in Applicants' claims 1 and 16.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. §102(b) as being anticipated by Bernier et al., the rejection of claim 1 under 35 U.S.C. § 102(e) as being anticipated by Utagikar et al., and the rejection of claim 16 under 35 U.S.C. § 103(a) as being unpatentable over Bernier et al.

The Examiner relied upon Chen et al., Alcoe et al. and Shaw et al. to allegedly cure various deficiencies of Bernier et al. However, Chen et al., Alcoe et al. and Shaw et al. fail to teach or suggest the feature of "an intermetallic heat spreader." Thus, Applicants respectfully submit that Chen et al., Alcoe et al. and Shaw et al. fail to cure the deficiencies of Bernier et al. and Utagikar et al. described above.

Accordingly, Applicants respectfully submit that the prior art of record, applied alone or in combination, fails to teach or suggest the unique combination and arrangement of elements recited in Applicants' claims 1 and 16. Claims 2-15 and 17 depend upon claims 1 and 16 and are therefore allowable for at least the reasons that claim 1 and 16 are allowable.

In view of the foregoing remarks, Applicants respectfully submit that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

Respectfully submitted,

Dated: December 15, 2005

Attorneys for Applicants

KEATING & BENNETT, LLP
8180 Greensboro Drive, Suite 850
Tyson's Corner, VA 22102
Telephone: (703) 637-1480
Facsimile: (703) 637-1499

Joseph R. Keating
Registration No. 37,368

Christopher A. Bennett
Registration No. 46,710